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**TRANSMITTAL  
FORM**

(to be used for all correspondence after initial filing)

Application Number	09/642,267
Filing Date	08/18/2000
First Named Inventor	Goguen et al.
Art Unit	2857
Examiner Name	Baran
Attorney Docket Number	100157-142

Total Number of Pages in This Submission

12

**ENCLOSURES (Check all that apply)**

- |   |  |   |
|---|--|---|
| <input checked="" type="checkbox"/> Fee Transmittal Form<br><input type="checkbox"/> Fee Attached<br><input checked="" type="checkbox"/> Amendment/Reply<br><input checked="" type="checkbox"/> After Final<br><input type="checkbox"/> Affidavits/declaration(s)<br><input checked="" type="checkbox"/> Extension of Time Request<br><input type="checkbox"/> Express Abandonment Request<br><input type="checkbox"/> Information Disclosure Statement<br><input type="checkbox"/> Certified Copy of Priority Document(s)<br><input type="checkbox"/> Response to Missing Parts/Incomplete Application<br><input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53 | <input type="checkbox"/> Drawing(s)<br><input type="checkbox"/> Licensing-related Papers<br><input type="checkbox"/> Petition<br><input type="checkbox"/> Petition to Convert to a Provisional Application<br><input type="checkbox"/> Power of Attorney, Revocation<br><input type="checkbox"/> Change of Correspondence Address<br><input type="checkbox"/> Terminal Disclaimer<br><input type="checkbox"/> Request for Refund<br><input type="checkbox"/> CD, Number of CD(s) _____ | <input type="checkbox"/> After Allowance communication to Technology Center (TC)<br><input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences<br><input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)<br><input type="checkbox"/> Proprietary Information<br><input type="checkbox"/> Status Letter<br><input checked="" type="checkbox"/> Other Enclosure(s) (please identify below):<br>- Postcard<br>- Notice of Appeal |
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Remarks

**SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT**Firm  
or  
Individual name

Rajesh Vallabh

Signature



Date

08/30/2004

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Jody Begley

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08/30/2004

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# FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 750.00

## Complete if Known

Application Number	09/642,267
Filing Date	08/18/2000
First Named Inventor	Goguen et al.
Examiner Name	Baran
Art Unit	2857
Attorney Docket No.	100157-142

## METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None
☒ Deposit Account:Deposit Account Number  
Deposit Account Name

08-0219

Wilmer Cutler Pickering  
Hale and Dorr LLP

The Director is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments☒ Charge any additional fee(s) or any underpayment of fee(s)☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

## FEE CALCULATION

## 1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1)			(\$) 0.00

## 2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	-20** =	X	
Multiple Dependent	-3** =	X	
		0	0

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
1202 18	2202 9	Claims in excess of 20
1201 86	2201 43	Independent claims in excess of 3
1203 290	2203 145	Multiple dependent claim, if not paid
1204 86	2204 43	** Reissue independent claims over original patent
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent
SUBTOTAL (2)		

SUBTOTAL (2) (\$)

\*\*or number previously paid, if greater, For Reissues, see above

## FEE CALCULATION (continued)

## 3. ADDITIONAL FEES

Large Entity Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for <i>ex parte</i> reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	420.00
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	
1402 330	2402 165	Filing a brief in support of an appeal	
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify)

\*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 750.00

## SUBMITTED BY

(Complete if applicable)

Name (Print/Type)	Rajesh Vallabh	Registration No. (Attorney/Agent)	35,761	Telephone	617-526-6505
Signature		Date	08/30/2004		

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**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Goguen et al.

Examiner: Baran

Serial No.: 09/642,267

Art Unit: 2857

Filed: August 18, 2000

For: Output Performance Trends of a Mass Storage System

**CERTIFICATE UNDER 37 C.F.R. § 1.8(a)**

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on 8/30, 2004.

  
Jody Begley

Mail Stop AF  
Assistant Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO FINAL OFFICE ACTION**

In the final office action dated April 2, 2004, the Examiner maintained the rejections of the claims set forth in the prior office actions, namely (1) Claims 1, 2 and 5-9 were rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 5,623,598 issued to Voigt et al. ("Voigt") in view of U.S. Patent No. 6,128,717 issued to Harrison et al. ("Harrison"), and (2) Claims 3 and 4 were rejected under § 103(a) as being unpatentable over Voigt in view of Harrison and further in view of U.S. Patent No. 5,586,059 issued to Oshelski et al. ("Okhelski"). Reconsideration and allowance of the application are requested.

The present invention is generally directed to a method of presenting system performance to a user in a mass storage system having multiple disk drive storage elements controlled by a disk drive controller. During operation, the disk drive controller receives commands and data from and returns data to multiple host computers. To determine how well the system is performing, the host computers can be operated to test the controller and the disk drive elements. Accordingly, potential problems that can create bottlenecks on communication lines connected from the controller to either the disk drive elements or the hosts can be identified.

The performance of a large storage system is particularly difficult to measure since there are multiple host computers, which connect to the disk drive controllers, and which can operate at the same time in serial or parallel fashion. As a result, a plurality disk drive elements, usually arranged in a disk drive array, operating in either an independent fashion, a RAID configuration, or a mirrored configuration, e.g., can have a significant yet undetectable bandwidth or operational problems that cannot be addressed or discovered when commands are sent only from a single host computer. The present application addresses this problem by executing at a plurality of the host computers a test request by sending commands to the mass storage system, and accumulating, at the executing host computers, data regarding performance of the mass storage system, in response to the requests sent by the host computers.

Claim 1, the only independent claim in the present application, is directed to a method for presenting system performance to a user in a mass storage system. The method features the steps of: (1) executing at a plurality of the host computers a test request by sending commands to the mass storage system, (2) accumulating, at the executing host computers, data regarding performance of the mass storage system, in response to the requests sent by the host computers, and (3) presenting the accumulated data, in a graphical plot format, for enabling the visualization of trends in the performance of the mass storage system as a function of at least one selected parameter, in response to the host generated commands.

The Examiner rejected Claim 1 as being obvious over Voigt in view of Harrison. The Examiner contends that Voigt discloses all the limitations of Claim 1 except for a controller connected to a plurality of host computers. The Examiner states that Harrison discloses a controller (interface structure 14) which is connected to a plurality of host computers (i.e., network environment). These rejections are respectfully traversed.

I. Harrison and Voigt Are Not Properly Combinable Under §103

Under §103, teachings of prior art references can be combined only if there is some suggestion or incentive to do so. The Harrison and Voigt references are not properly combinable because neither reference provides any suggestion or incentive for combination with the other.

Voigt discloses a system for identifying methods of improving performance in a data storage system having a single host computer station connected to a data storage system having an array of storage disks. The Examiner acknowledges that Voigt does not teach a controller connected to a plurality of host computers.

Voigt, therefore, does not disclose or in any way suggest a disk drive controller receiving commands and data from and returning at least data to a plurality of host computers. Furthermore, Voigt does not disclose or in any way suggest (1) executing at a plurality of host computers a test request by sending commands to the mass storage system, or (2) accumulating, at the executing host computers, data regarding performance of the mass storage system in response to the requests sent by the host computers.

As previously noted, there are significant performance issues (e.g., undetectable bandwidth or operational problems) existing in systems with multiple host computers that cannot be addressed or discovered when commands are sent only from a single host computer. Voigt's single host computer system does not face or recognize these problems, much less provide any sort of solution. One skilled in the art reading this

reference would find no suggestion or incentive for adding a plurality of host computers in Voigt and, much less of executing a test request at the plurality of host computers, or accumulating, at the executing host computers, data regarding performance of the mass storage system.

The Examiner relies on Harrison for disclosing a controller connected to a plurality of host computers. Harrison discloses a method of recording data onto a disk drive by categorizing the data into data types. Harrison is not directed to solving or even recognizes the problem of determining or presenting system performance to a user of a mass storage system. Furthermore, Harrison is not concerned with the problems associated with measuring performance using even a single host computer, much less multiple host computers.

The Examiner relies on col. 5, lines 46-53 of Harrison for supposedly teaching that “providing performance data for a plurality of hosts can enhance the overall performance of a storage system.” The Examiner concludes that it would therefore be obvious to add Harrison’s plurality of host computers to the teaching of Voigt. This cited passage of Harrison, however, only discloses some type of internal data object analysis process that analyzes data objects being sent to a disk drive from hosts and stores the data objects at particular storage locations of the disk drive to provide “access performance” depending on the type of data object. This does not in any way relate to (1) executing at a plurality of host computers a test request by sending commands to the mass storage system, or (2) accumulating, at the executing host computers, data regarding performance of the mass storage system in response to the requests sent by the host computers. There are no test requests from host computers, and there is no accumulation of data regarding performance of the storage system in response to the requests, much less accumulation of performance data at the host computers.

The “access performance” mentioned by Harrison is apparently some level of performance resulting from storing data objects in particular locations based on the type of object stored. This access performance is (1) not something that is tested, and (2)

not in any way related to the presence of a plurality of host computers instead of a single host computer. In fact, the cited passage explicitly states that data can be sent from a single host or multiple hosts. Harrison's access performance does not require and is not the result of having multiple hosts. There is no stated added benefit to using multiple hosts as opposed to a single host. Accordingly, one skilled in the art reading this reference would have no reason to even consider adding multiple hosts to any system.

In the "Response to Arguments" section of the office action, the Examiner further explains the teachings of Harrison. Applicants disagree with these contentions.

A. Harrison does not disclose or suggest collecting data regarding the performance of a mass storage system

The Examiner states that "Harrison teaches that the performance data collected is different information and statistics about the data object, such as number of objects accessed by the host since disk drive initialization and total storage space already used (see Harrison, col. 12, lines 39-65)." This cited passage describes use of so-called SAPIs (storage application programming interface) for fetching statistics and information about objects that are stored. The statistics include, as the Examiner notes, statistics on the number of objects accessed by the host since disk drive initialization and total storage space already used. These, however, are general statistics, e.g., on the status of objects and disks; they are not statistics regarding the performance of the mass storage system. Performance relates to how well some task is accomplished. For example, as noted in the specification on page 1, lines 11-13, the performance of a system can be typically measured in terms of I/O response times, i.e., the time it takes for a read or write command to be acted upon as far as the host computer is concerned, by the disk drive controller system. The SAPI fetched statistics are therefore not data regarding the performance of a mass storage system.

B. Harrison does not disclose or suggest collecting data in response to a test request from a host computer

Even assuming, for the sake of argument, that the data fetched by the SAPIs is considered data regarding performance of a mass storage system, Harrison does not teach or in any way suggest that the data is collected in response to a test request from a host computer. It is unclear from the reference how the SAPI fetched data is collected or when it is collected. However this data is collected, it is not done in response to a test request from a host computer.

C. Harrison does not disclose or suggest collecting data in response to test requests executed by a plurality of host computers

The Examiner states that the SAPI fetched data “relates to the either the host requesting the data [i.e., number of objects accessed by the host (see Harrison, column 12, lines 41-42)] or the entire network which has access to the storage [i.e., total storage space already used (see Harrison, column 12, lines 42-43)]. While the “total storage space already used” might affect the operation of the entire network including other host computers in the network, this statistic does not in any way relate to test requests executed by a plurality of host computers. In fact, none of the statistics are collected in response to a test request from any host computer, much less a plurality of host computers.

Voigt and Harrison are simply not combinable in the manner suggested by the Examiner. The simple fact that Harrison teaches a plurality of host computers does not make it combinable with Voigt. The combination is wholly improper and fails to make a prima facie showing of obviousness.

II. Even If Combined, Harrison and Voigt Do Not Teach The Claimed Invention

Even assuming, for the sake of argument, that Voigt and Harrison are properly combined under § 103, the combination does not disclose each and every element of the claims. The Examiner states that Voigt discloses executing at a single host computer a test request by sending commands to a mass storage system, and accumulating at the single host computer data regarding performance of the mass storage system. The




Examiner further states that Harrison teaches a plurality of host computers connected to some interface structure, and that one could combine the teachings of the references. As noted above, Harrison, however, does not disclose either (1) executing at a plurality of host computers a test request by sending commands to the mass storage system, or (2) accumulating, at the executing host computers, data regarding performance of the mass storage system in response to the requests sent by the host computers. Harrison simply discloses, as the Examiner contends, a plurality of host computers connected to an interface structure. Thus, if Harrison were combined with Voigt as suggested by the Examiner, there would, at best, be a plurality of host computers, one of which would be Voigt's host computer, which would be the only computer executing a test request and accumulating performance data thereat. The other hosts would not be performing these functions. The claims would be distinguishable from this combination teaching because the claims require (1) executing at a plurality of host computers a test request by sending commands to the mass storage system, or (2) accumulating, at the executing host computers, data regarding performance of the mass storage system in response to the requests sent by the host computers. Since each and every element of the claims is not disclosed by this combination of references, the rejection fails under § 103, and should be withdrawn.

The final office action fails to respond to Applicants' position that the combination of Voigt and Harrison, even assuming if proper, would not teach all the elements of the claimed invention.

Claim 1 and its dependent claims are all allowable over the Voigt and Harrison references.

Claims 1-9 are pending in the present application. As the application is now believed to be in condition for allowance, issuance of a Notice of Allowance is respectfully requested.

Respectfully submitted,



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August 30, 2004

Attorney Docket No.: 100157.142